

# 2016 Integrated Resource Plan Public Webinar Series

*Part 3: Supply Side Options*

**Wyoming Municipal Power  
Agency**

July 5, 2016



# Agenda

- ▶ Projected Need
- ▶ Supply Side Options
- ▶ Expansion Plan Analysis
- ▶ Next Steps

# Study Methodology

Develop 30-year Load Forecast

Ability of existing resources to meet future load demand

Develop Model

Evaluation of demand side management

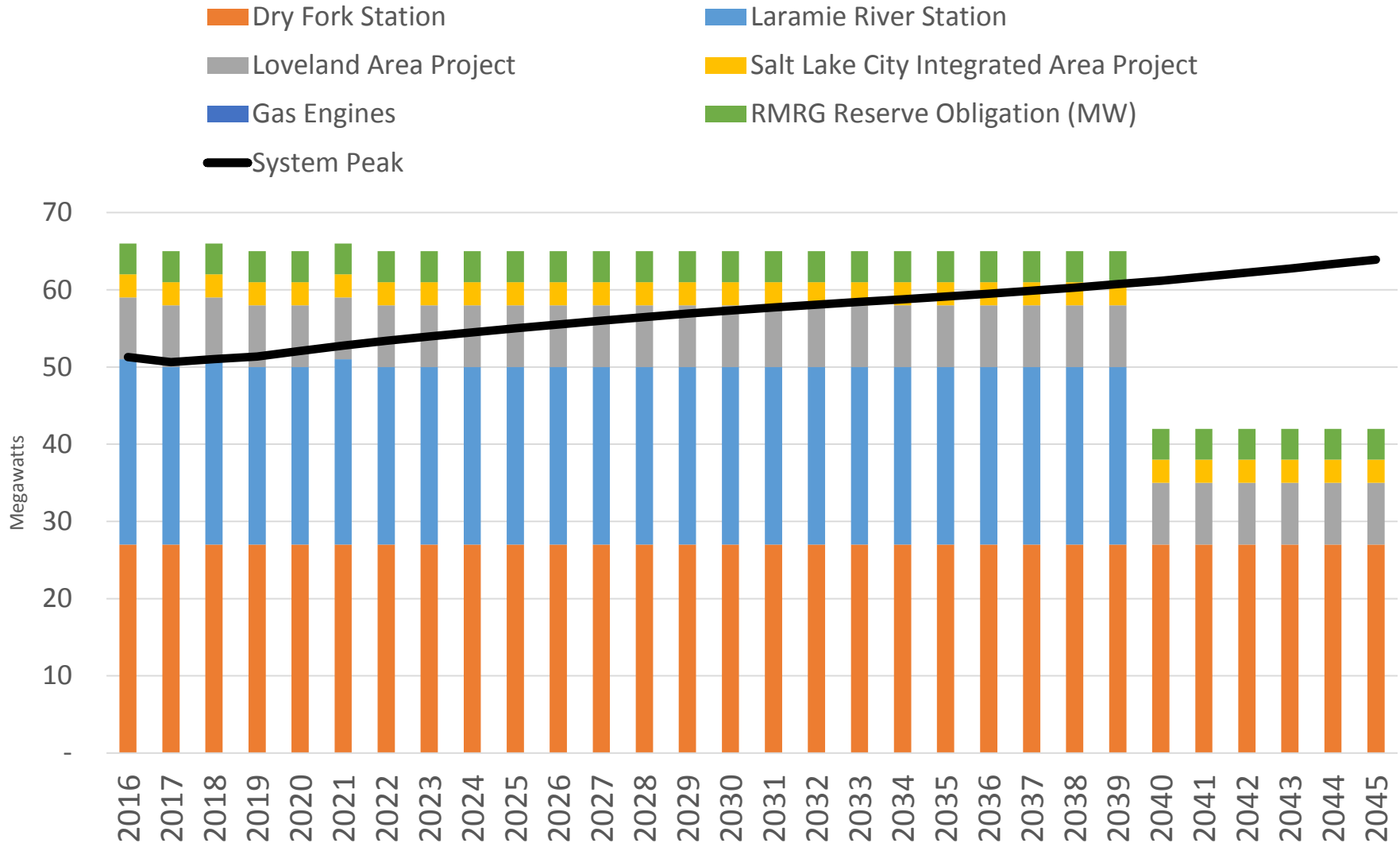
Evaluation of supply side options

Evaluation of integrated supply and demand side

Conclusion & Recommendations

Propose a 5- and 30-year plan to meet needs

# Balance of Loads and Resources



# Current Situation

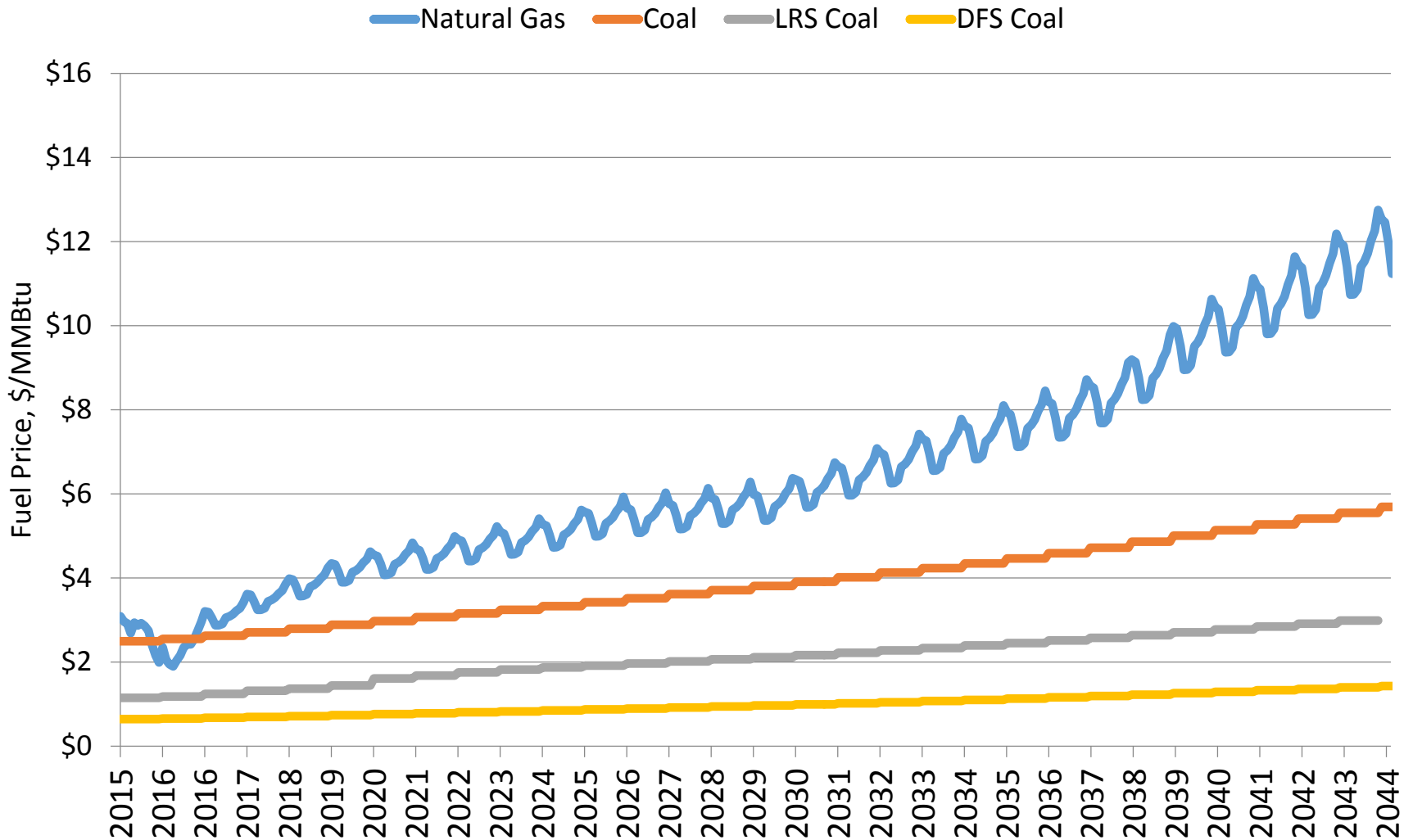
- ▶ 25 MW capacity deficit by 2040 due to LRS retirement
- ▶ Significant portion of current resources are “base load”
- ▶ Peaking resource is likely “best fit” based on current resources
- ▶ Efficient base load resource would be preferred when LRS retires

# Supply Side Options

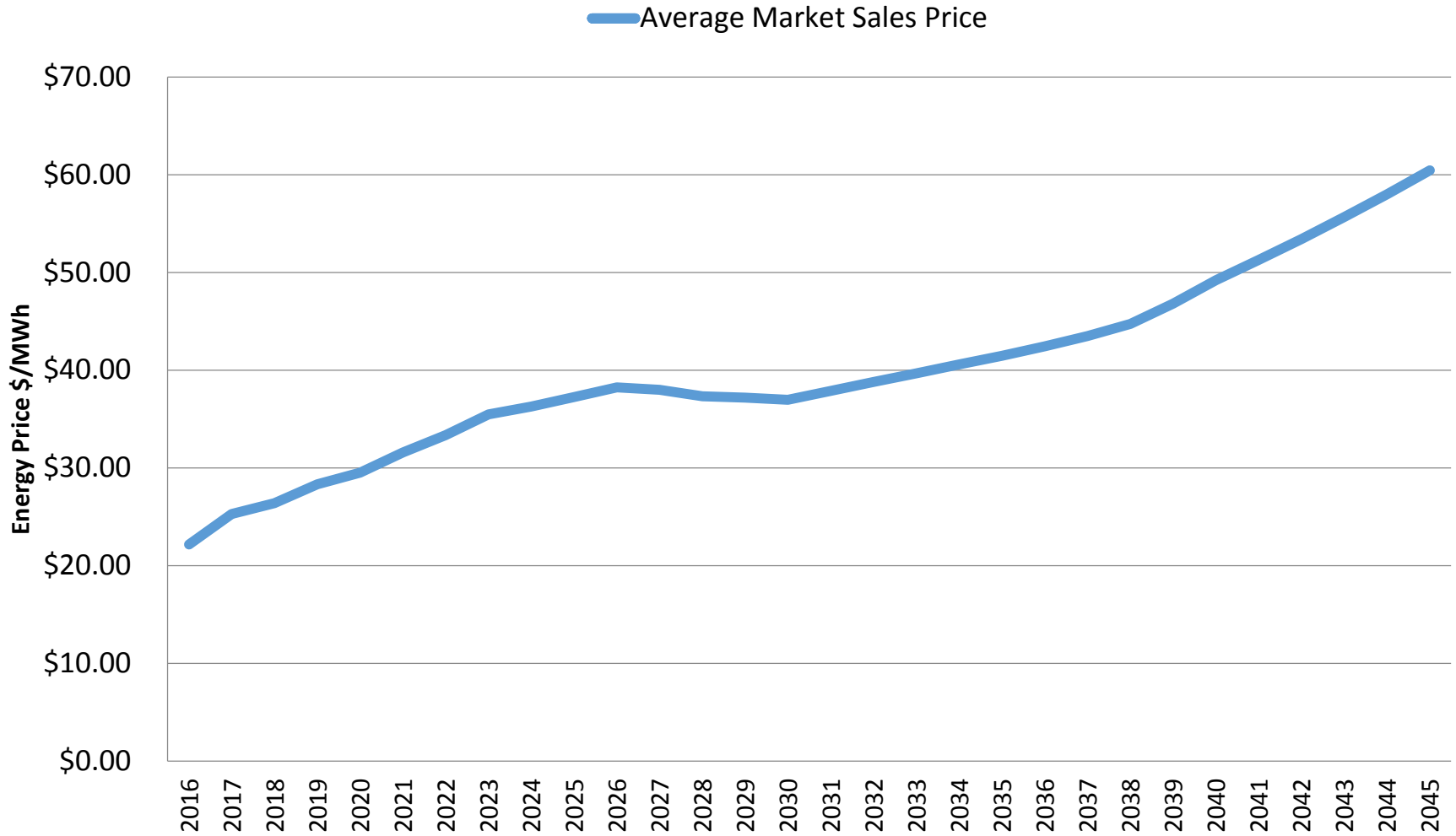
Name	Technology	Nameplate MW	Earliest COD
<b>Intermediate</b>			
CCGT	1x1 GE 7FA Combined Cycle Fully Fired*	403.2	2020
<b>Peaking</b>			
Engines	3xWartsila 20V34SG Engines	27.5	2019
<b>Renewable</b>			
Solar	Crystalline Silicon PV Modules	25	2018
Wind	Vestas V112-3.0 Wind Turbines	25	2020

\*Only assuming 27.5 MW stake in a combined cycle

# Fuel Price Forecast



# Market Sales Price

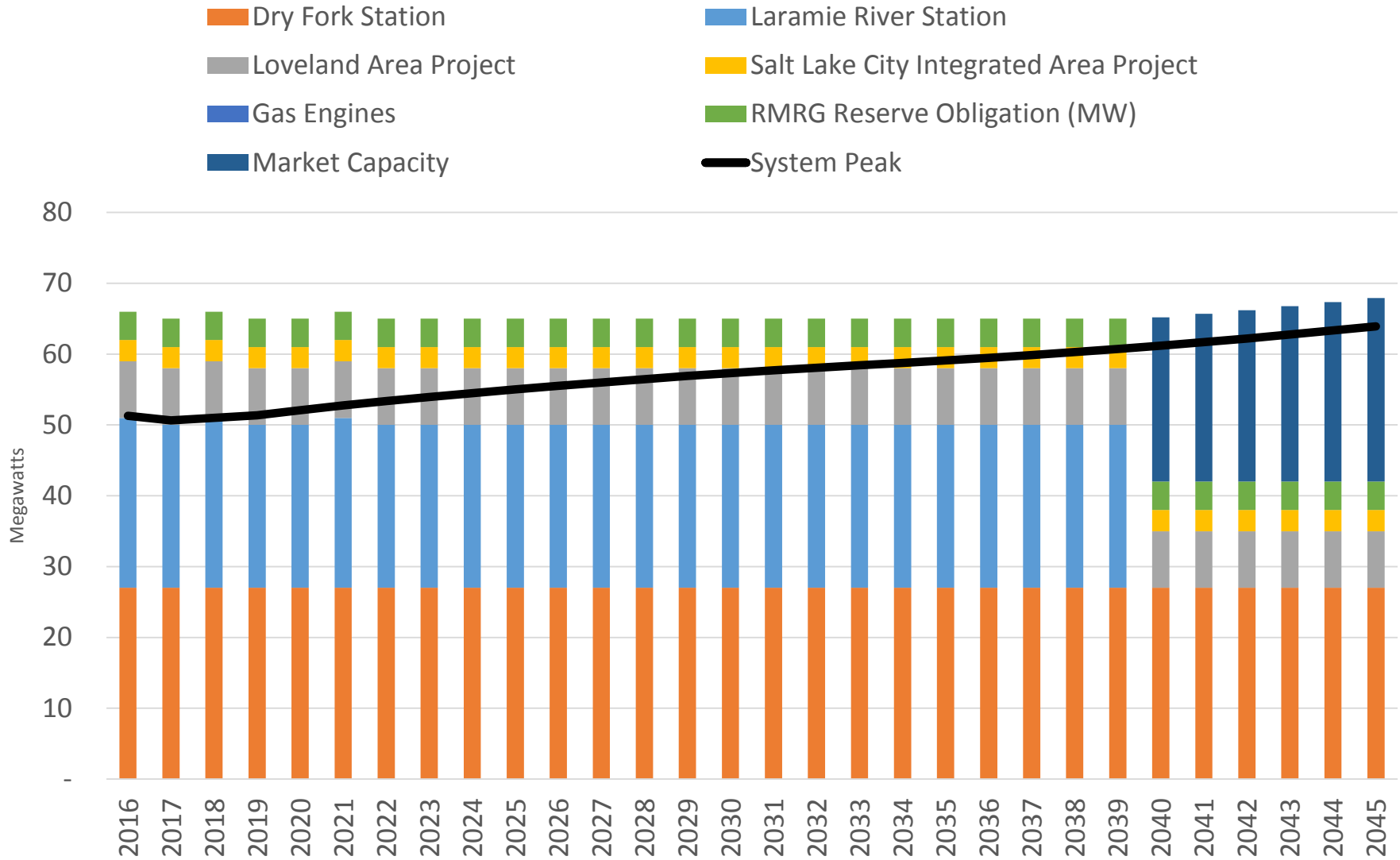




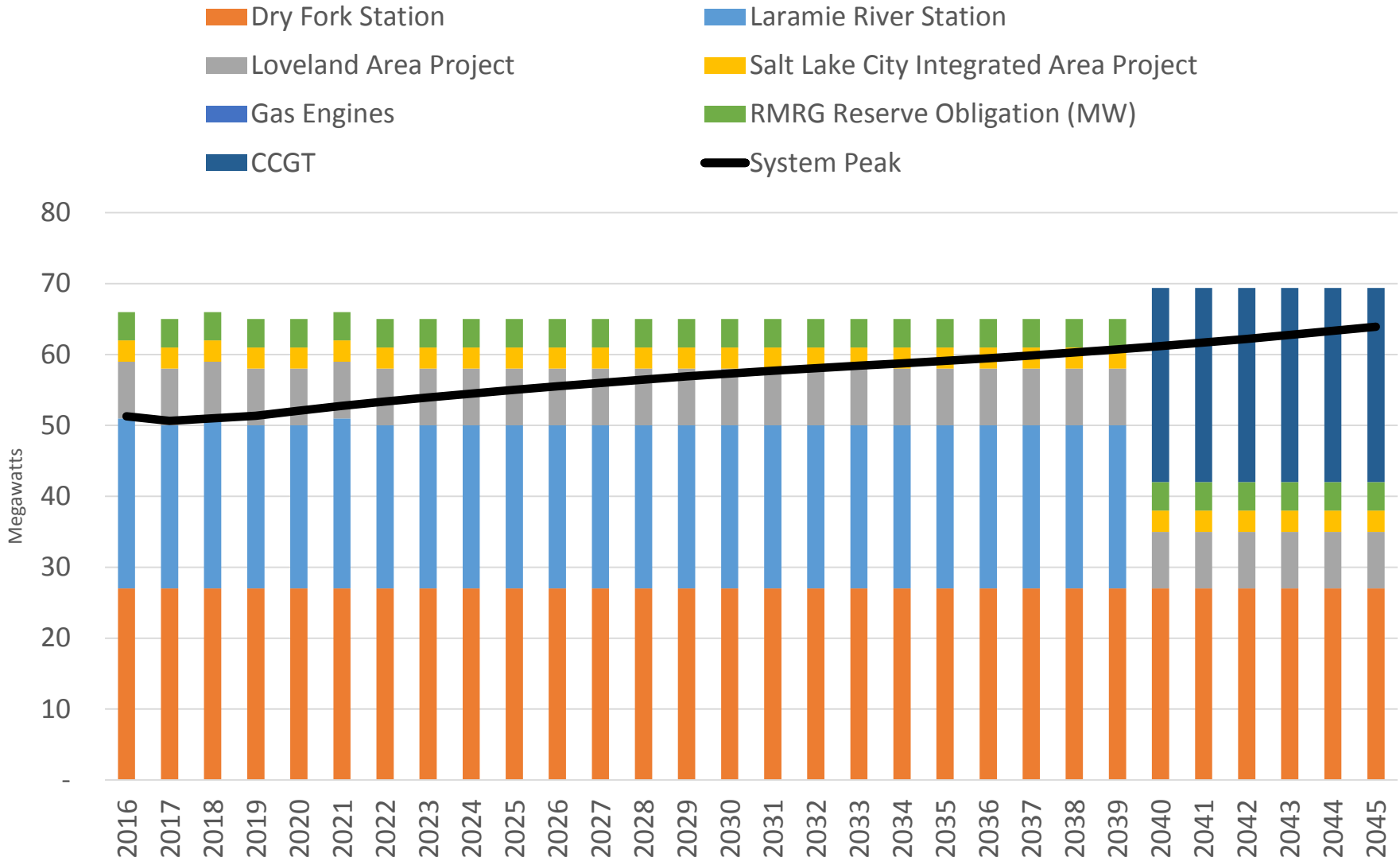
# Resource Scenario Development

- ▶ Market Capacity Purchases
- ▶ Combined Cycle Participation
- ▶ Reciprocating Engines
- ▶ Reciprocating Engines and Wind PPA
- ▶ Reciprocating Engines and Solar PPA

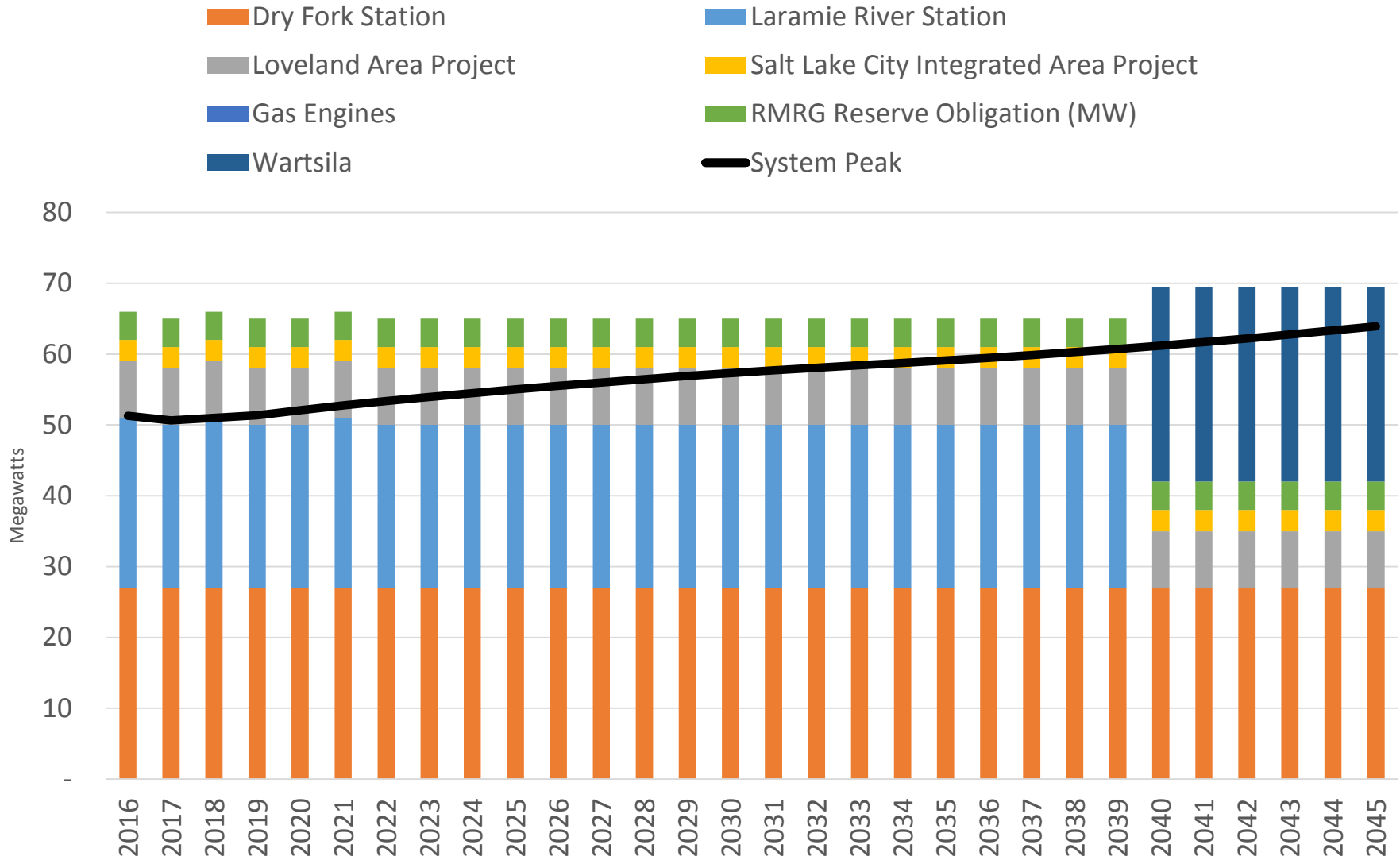
# Market Capacity Only



# Combined Cycle



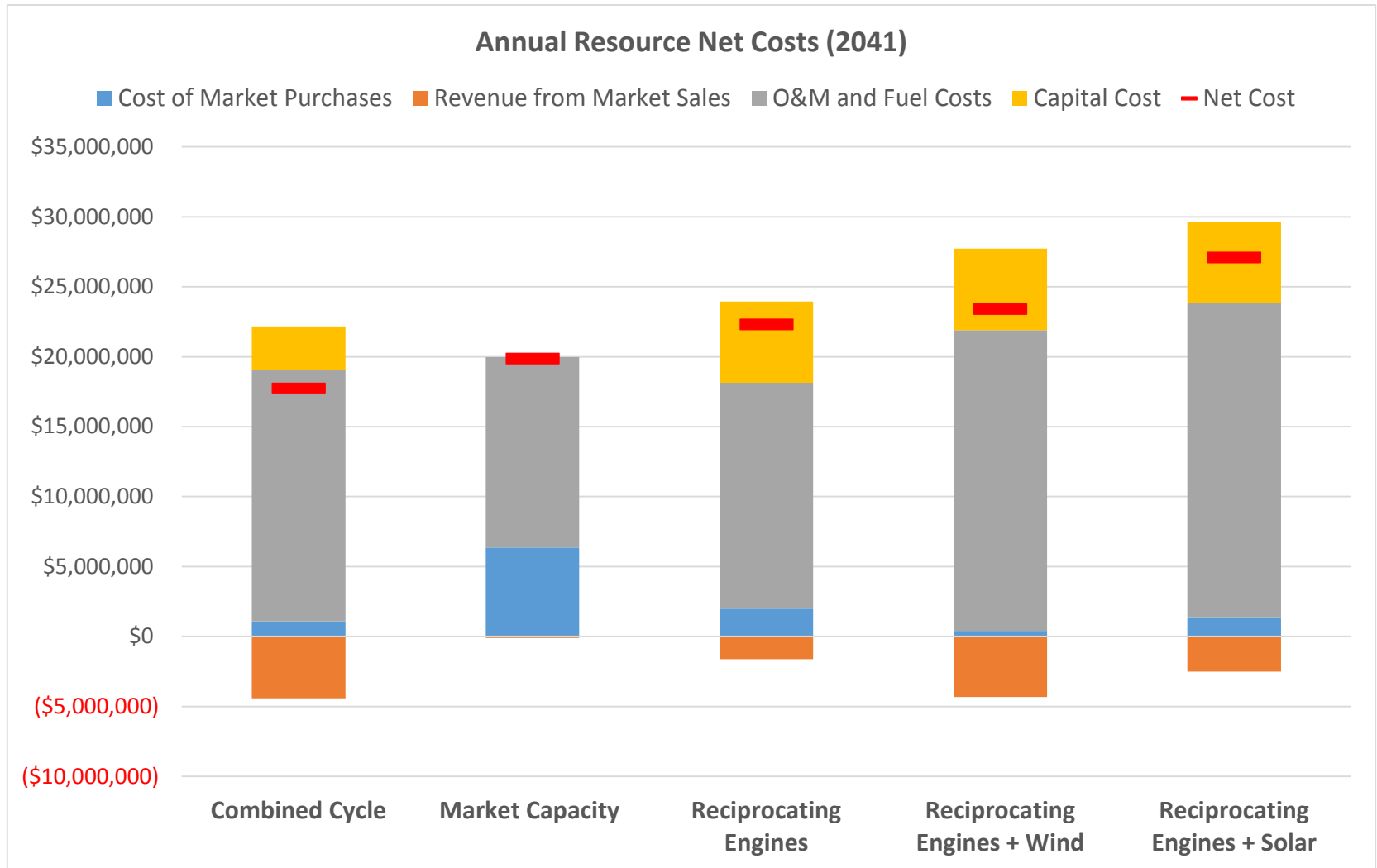
# Wartsila Gas Engines



# Scenario Comparison

Scenario	Combined Cycle	Market Capacity	Reciprocating Engines	Reciprocating Engines + Wind	Reciprocating Engines + Solar
New Resource COD	2040	N/A	2040	2040	2040
Capacity (MW)	27.39	N/A	27.5	27.5	27.5
Renewable Capacity (MW)	N/A	N/A	N/A	25	25
Total Scenario Cost	\$374,800,000	\$378,300,000	\$381,300,000	\$382,300,000	\$387,700,000
% Different (from low)	0.00%	0.93%	1.73%	2.00%	3.44%

# Resource Annual Cost Summary



# Scenario Considerations

## ▶ Combined Cycle

- Limited by availability of projects being developed in the area.
- Joint ownership may cause operational issues.
- Lowest cost plan

## ▶ Market Capacity

- Availability of market capacity fluctuates over time, making cost difficult to predict.
- Integrated market places may effect future market purchases.

# Scenario Considerations

## ▶ Wartsila Engines

- Control over project development and operation.
- Higher cost on a \$/kW basis than Combined Cycle.

## ▶ Wartsila Engines & Wind

- Need gas firming for “un-schedulable” wind.
- Higher wind cost in the future does not beat the market

## ▶ Wartsila Engines & Solar

- Need gas firming for “un-schedulable” solar.
- Highest cost scenario considered.



# Next Steps

## ▶ Continuing Public Webinar Series:

- Part 1 – Study Introduction & Background  
June 21: 11:00 am -12:00 pm Mountain Time
- Part 2 – Demand Side Management  
June 28: 11:00 am -12:00 pm Mountain Time
- Part 3 – Supply Side Options  
July 5: 11:00 am -12:00 pm Mountain Time
- Part 4 – Integrated Analysis  
July 12: 11:00 am -12:00 pm Mountain Time

# Questions

Please send questions and comments to:  
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Visit WMPA's website for more information on  
the IRP:  
[www.wmpa.org](http://www.wmpa.org)

Thank you for your time.